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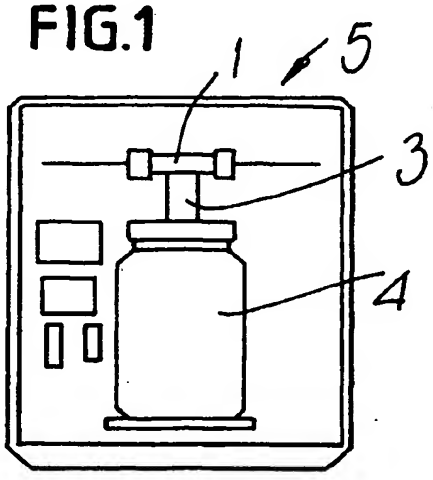
(54) Device for electrically vaporizing active principles

(57) The device for electrically vaporizing active principles comprises at least one element (3) adapted to be impregnated with a substance that contains the active principle to be vaporized and at least one heating element (1) which is adapted to produce the vaporization of the substance that contains the active principle from the impregnated element. The device has a timer which is adapted to control the flow of electric current through the heating element (1) for the selective high-temperature pulsed heating of the heating element (1) to a temperature which is close to the boiling point of the substance that contains the active principle.

FIG.1



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contact with the liquid and the wick, provided that a path allowing to rapidly remove the generated stream of vapor is formed.

[0015] The heating element 1 is inserted in a body 5 of the device which forms an adapted seat for the bottle 4.

[0016] The body 5 is conveniently constituted, as shown in detail in Figure 3, by two shells 6 and 7, respectively a front shell and a rear shell, which are adapted to be mutually associated. The front shell 6 is closed by a cover 8, while the rear shell 7 is provided with a plug 9 for the supply of electric power to the device.

[0017] A base 10 is enclosed between the shells 6 and 7 in the assembly position and acts as support for an electronic timer 11 which is adapted to control the flow of electric current through the heating element 1 in order to produce selective pulsed heating at preset and adjustable times.

[0018] More specifically, as shown schematically in Figures 4 and 5, the timer 11 has a microprocessor 12 and is supplied by means of an adapted power supply 13 which is connected to the electric mains 14 and whose input is on the plug 9 of the device. The timer 11 controls the flow of electric current to the heating element 1 by means of a solid-state relay 15. The relay 15 detects a variation in the power supply circuit and accordingly produces a variation in the controlled circuit, i.e., in the heating element 1.

[0019] The operation of the device is easily understandable from the above description.

[0020] The timer 11 controls the flow of electric current through the heating element 1, producing consequent heating at preset and adjustable times. The electric current is emitted in pulses whose frequency and duration are appropriately adjusted by said timer 11.

[0021] In this manner, it is possible to obtain for a short time, for example in the order of 2-20 seconds, a stream at high temperature, by way of example 150-250 °C, and then leave it to cool for a significantly longer time, for example 10-400 seconds.

[0022] The resulting effect, also by virtue of the low thermal inertia of the resistor that constitutes the heating element 1, is that a high temperature, close to or higher than the boiling point of the liquid with which the wick 3 is impregnated, is applied to the wick 3 during said pulses, so as to achieve instant evaporation of the surface liquid or at least part thereof.

[0023] By varying the heating time, i.e., the duration of the pulses, the amount of liquid evaporated during each pulse is adjusted, while by varying the repetition rate of the pulses the amount of liquid vaporized during one hour is adjusted as required.

[0024] The subsequent cooling allows to keep the wick 3 at a low temperature and also allow the time required by the liquid to saturate the region of the wick that is affected by the air stream. This also helps to ensure the cleanliness of the wick 3.

[0025] If it is necessary to have shorter times or higher temperatures, the same effect can be obtained by direct contact of the heating element 1 with the surface of the wick 3.

[0026] However, depending on the nature of the liquid to be vaporized, direct contact of the wick 3 with the heating element may produce on the wick deposits which may, over time, compromise the constancy of the performance of the device, i.e., of the ratio between applied heat and amount of vaporized liquid.

[0027] Accordingly, in a hood 100 of the device (embodiment thereof is shown in Figures 8, 9 and 10), the wick 3 is spaced in a preset manner from heating resistors 101.

[0028] The wick is meant to be inserted loosely in a hole 102 which passes through the hood 100 and remains between two half-shells 103 that constitute it.

[0029] The two half-shells 103 are mutually joined, at their edges, by means of the facing engagement of pins 104 in mutually opposite dead holes 105 which respectively protrude from, and are recessed in, the edges of both half-shells.

[0030] The hole 102 is substantially produced by the joining of two facing semicircular recesses 106 which affect the edges of the two half-shells 103 at two opposite sides of the hood 100 and have a radius which is greater than the transverse cross-section of the wick 3.

[0031] The seats of the heating resistors 101 are elongated in a direction which is parallel to the hole 102 and are open toward said hole in diametrically opposite positions. Their heads have respective seats which are formed, at said two opposite sides of the hood 100, by the coupling of two facing recesses 107 provided inside the half-shells 103.

[0032] Wires 108 for the electrical connection of the resistors 101 exit from the hood 100 through holes formed by the coupling of facing notches 109 of the edges of the half-shells 103.

[0033] The wick 3 is centered within the hole 102 and spaced from the resistors 101 by means of the contoured raised portions 110, which protrude from the front walls of the half-shells 103. Of course, it is also possible to accommodate just one resistor within the half-shells.

[0034] By means of the selective heating provided in pulses whose duration and frequency can be adjusted, the device accordingly achieves the aim of allowing a dosage which is independent of the chemical and physical characteristics of the substance to be vaporized. It is in fact always possible to reach the boiling point of the liquid and therefore achieve almost instant evaporation.

[0035] In such conditions, the amount of liquid evaporated during one pulse is proportional to the energy of the pulse and inversely proportional to the latent heat of evaporation that is characteristic of the liquid.

[0036] Furthermore, by means of the timer 11 it is possible to provide adapted cycles for modulating the emission of the active principle, such as to simulate for

active principle that impregnates said element, so as to achieve instant evaporation of said substance that contains said active principle.

5. The device according to claim 1, characterized in that said impregnated element is constituted by a wick which protrudes from at least one bottle which contains said active principle in a liquid mixture.

6. The device according to claim 5, characterized in that it comprises two bottles with a corresponding wick and two respective heating elements, and in that said timer selectively activates either of said heating elements.

7. The device according to claim 5, characterized in that it comprises: a hood through which a hole passes, said wick being meant to be inserted loosely in said hood; seats which are formed in said hood so as to accommodate at least one of said heating elements and are open toward said hole; raised portions for centering said wick in said hole so that the wick is spaced from said heating element.

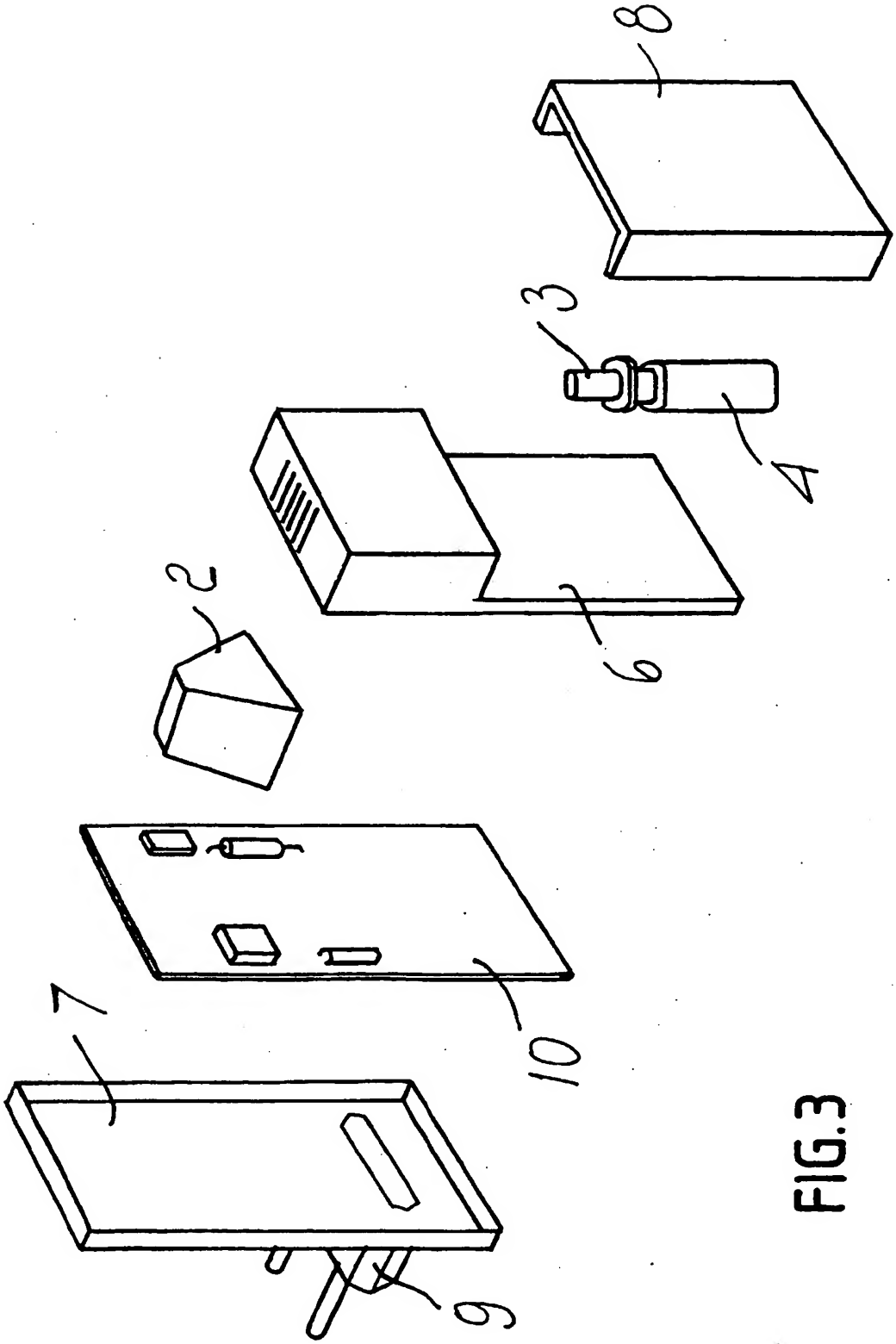
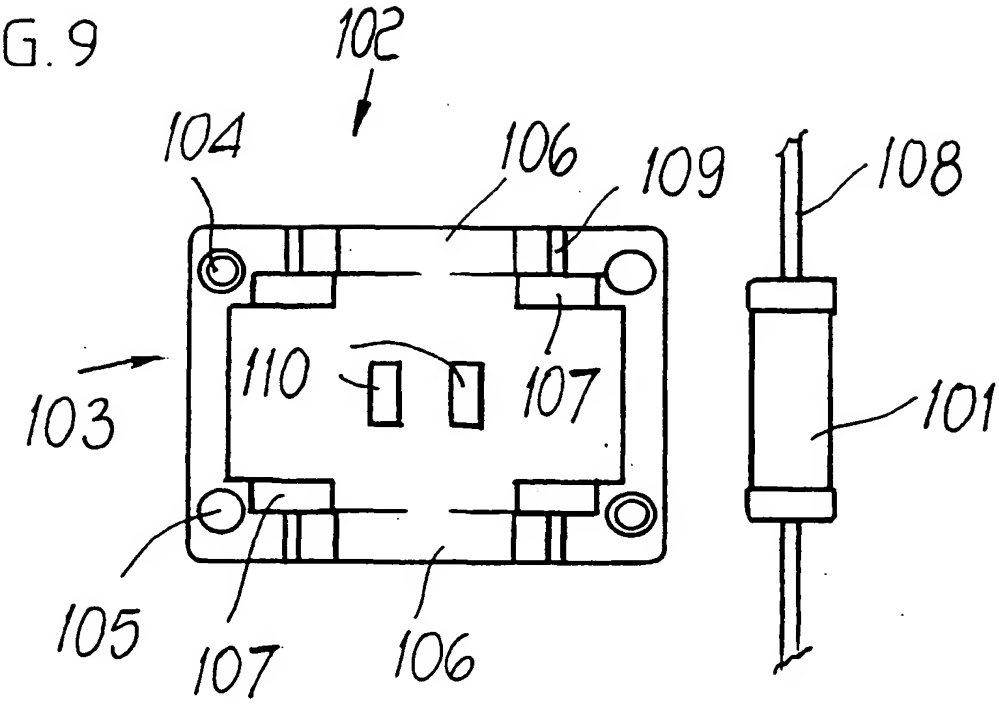


FIG.3

FIG. 9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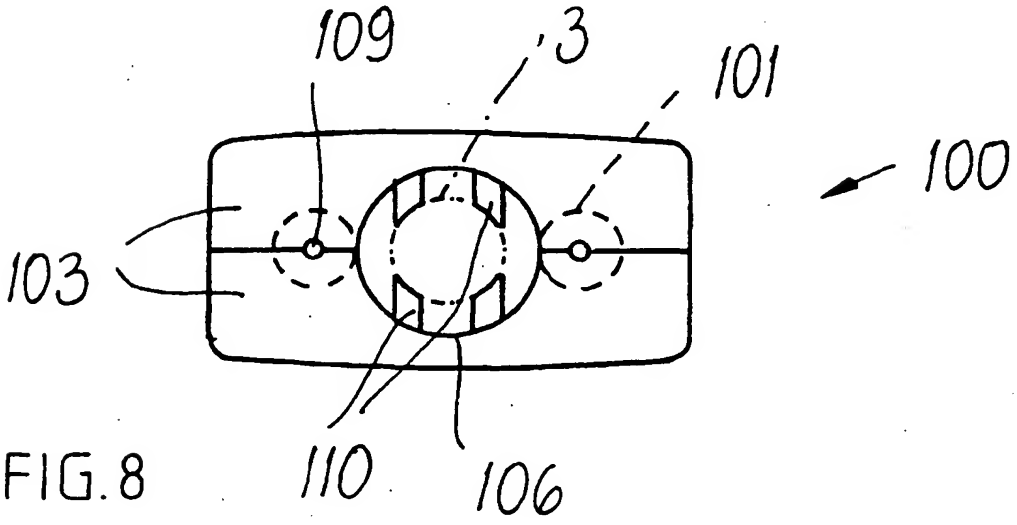
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100
103
110
106

FIG. 8